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# **Office of Pipeline Safety Presentation on**

## **Direct Assessment**



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# http://primis.rspa.dot.gov/rd/

## Research & Development

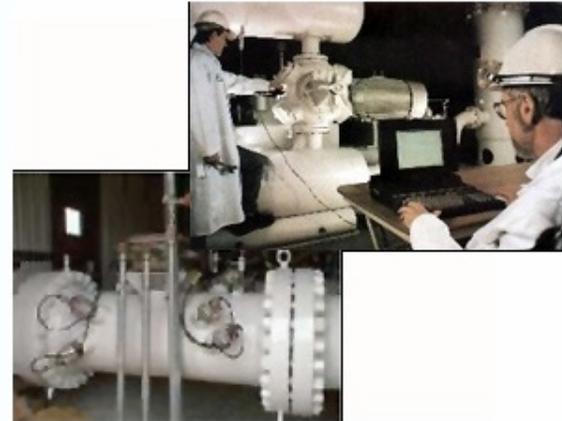
Welcome to RSPA's Pipeline Safety Research and Development Website.

This site is dedicated to the coordination and dissemination of Research and Development information related to Pipeline Safety.

OPS conducts and supports research to support regulatory and enforcement activities and to provide the technical and analytical foundation necessary for planning, evaluating, and implementing the pipeline safety program. OPS is sponsoring research and development projects focused on providing near-term solutions that will increase the safety, cleanliness, and reliability of the Nation's pipeline system.

Recent R&D projects are focused on: leak detection; detection of mechanical damage; damage prevention; improved pipeline system controls, monitoring, and operations; and, improvements in pipeline materials. These projects are addressing technological solutions that can quickly be implemented to improve pipeline safety.

In 2003, [a study by the General Accounting Office \(GAO\)](#) found that OPS's R&D program is aligned with OPS's mission and pipeline safety goals.



# Direct Assessment Research

Project Title	Researcher	OPS	Co-Share	(MO)	%
Internal Corrosion Direct Assessment (ICDA) of Gas Transmission, Gathering, and Storage Systems	Southwest Research Institute	\$191,000.00	\$313,000.00	24	100
Improvements to the External Corrosion Direct Assessment Methodology by Incorporating Soils Data	Battelle Memorial Institute	\$201,000.00	\$201,000.00	24	77
Corrosion Assessment Criteria: Rationalizing Their Use Applied to Early vs Modern Pipelines	Battelle Corporation	\$196,000.00	\$221,000.00	24	73
Determining Integrity Reassessment Intervals Through Corrosion Rate Modeling And Monitoring	Southwest Research Institute	\$300,000.00	\$300,000.00	15	32
Applying External Corrosion Direct Assessment (ECDA) to Difficult to Inspect Areas	Battelle	\$200,000.00	\$114,000.00	18	14
Model Modules to Assist Assessing and Controlling Stress Corrosion Cracking (SCC)	Battelle	\$289,923.00	\$700,000.00	24	11
Development of ICDA for Liquid Petroleum Pipelines	CC Technologies Laboratories, Inc.	\$181,636.00	\$315,114.00	12	6
Evaluation and Validation of Aboveground Techniques for Coating Condition Assessment	CC Technologies Laboratories, Inc.	\$129,988.00	\$621,000.00	12	6

## Portfolio Summary (8 Projects)

Total OPS Funding	\$1,698,547
Total Industry Co-Funding	\$2,785,114
Average Project Duration	19 months
Average % Complete	40 %



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# OPS R&D Projects

**Project Title:** Internal Corrosion Direct Assessment (ICDA) of Gas Transmission, Gathering, and Storage Systems

**Researcher:** Southwest Research Institute

**Goal:** Develop and validate a method to assess the integrity of pipelines with respect to internal corrosion by identifying and prioritizing locations of corrosion damage.

**Objectives:**

- Develop dry gas validation protocol
- Assessment of risk and corrosion models available
- Identify and collect field data sources for validation
- Gather gas quality data for U.S. pipelines
- Development of probabilistic model and flow calcs
- Issue quarterly and final reports



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# OPS R&D Projects

**Project Title:** Improvements to the External Corrosion Direct Assessment Methodology by Incorporating Soils Data

**Researcher:** Battelle Memorial Institute

**Goal:** Add soils data to the previously developed external corrosion direct assessment (ECDA) datasets and methodology.

**Objectives:**

- Provide accurate & reliable predictions of corrosion damage to pipelines.
- Project to complement ongoing ECDA work throughout the pipeline industry.
- Improving the performance of individual aboveground inspection methodologies
- Collecting data, and metrics for demonstrating the performance of ECDA
- Provide operator support for submitting of related field records
- Issue quarterly and final reports



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# OPS R&D Projects

**Project Title:** Corrosion Assessment Criteria: Rationalizing Their Use Applied to Early vs Modern Pipelines

**Researcher:** Battelle Corporation

**Goal:** Develop quantitative measures that determine which of the current corrosion assessment criteria are valid to assess corrosion defect severity and determine failure pressure.

## **Objectives:**

- Evaluate literature
- Develop guideline for seam welds, defect geometry and loading – Specimens
- Conduct parametric analysis - Pipelines
- Conduce full scale test
- Establish trends based on test results
- Issue quarterly and final reports



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# OPS R&D Projects

**Project Title:** Determining Integrity Reassessment Intervals Through Corrosion Rate Modeling And Monitoring

**Researcher:** Southwest Research Institute

**Goal:** Develop easy to implement methods based on sound physical principles to estimate (i) external corrosion rates, especially in CP shielded areas and (ii) internal corrosion rates by considering pipeline-relevant factors for gas and liquid lines

**Objectives:**

- Plan validation experiments for external corrosion modeling
- Compare predicted potential, pH, and rates to literature experiments
- Develop scaling parameters for external corrosion
- Obtain field data on external corrosion and compare to model predictions
- Issue quarterly and final reports



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# OPS R&D Projects

**Project Title:** Applying External Corrosion Direct Assessment (ECDA) to Difficult to Inspect Areas

**Researcher:** Battelle Memorial Institute

**Goal:**

Validation of Direct Assessment methodologies for both external corrosion and stress-corrosion cracking

Development of improved modules for determining stress-corrosion cracking

Improving integrity of systems with wrinklebends and buckles

Develop viable approach to running fracture minimize its consequences

**Objectives:**

This is a consolidated program. For a complete list of objectives go to:

<http://primis.rspa.dot.gov/matrix/PrjHome.rdm?&prj=162>



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# OPS R&D Projects

**Project Title:** Evaluation and Validation of Aboveground Techniques for Coating Condition Assessment

**Researcher:** CC Technologies Laboratories, Inc

**Goal:** Determine the limitations/resolution of typically used modern aboveground ECDA techniques with respect to locating holidays and disbondments in the common coatings with varying spatial relationships and geometrical configuration, and to create an extensive test site which enables a wider array of variables to be investigated.

**Objectives:**

- Perform close interval survey(CIS) for first field location
- Review close interval survey data for first field location
- Excavate various sites and catalogue defects
- Issue quarterly and final reports



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# OPS R&D Projects

**Project Title:** Development of ICDA for Liquid Petroleum Pipelines

**Researcher:** CC Technologies Laboratories, Inc.

**Goal:** The goal of this project is to develop an ICDA method applicable to hazardous liquid pipelines.

**Objectives:**

Develop an ICDA method applicable to pipelines transporting liquid petroleum products (e.g., crude oil, fuels) so that liquid pipeline operators can utilize DA for integrity verification



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# OPS R&D Projects

**Project Title:** Model Modules to Assist Assessing and Controlling Stress Corrosion Cracking (SCC)

**Researcher:** Battelle Memorial Institute

**Goal:** Validation of the newly available direct assessment methodologies for both external corrosion and stress-corrosion cracking; development of improved modules for assisting operators with controlling the parameters that cause stress-corrosion cracking; approaches for improving the integrity of systems with wrinklebends and buckles; and a viable approach to running fracture that should help operators minimize its consequences when ruptures occur.



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